

mass spectrometry) or a LC-MRM-MS (liquid chromatography-multiple reaction monitoring-mass spectrometry) analyses.

11. A system for identifying host cell protein (HCP) impurities in a sample, comprising:

a solid support;

interacting peptide ligands,

wherein said interacting peptide ligands are attached to said solid support, and

wherein said HCP impurities can bind to the interacting peptide ligands;

a solution comprising a surfactant;

an enzymatic digestion solution capable of generating components from said HCP impurities; and

a mass spectrometer capable of identifying or quantifying said components.

12. The system of claim **11**, wherein the surfactant is a phase transfer surfactant, an ionic surfactant, an anionic surfactant, a cationic surfactant, or combinations thereof.

13. The system of claim **11**, wherein the surfactant is sodium deoxycholate, sodium lauryl sulfate, or sodium dodecylbenzene sulphonate.

14. The system of claim **11**, wherein a concentration of the at least one high-abundance peptide or protein is about at

least 1000 times, 10,000 times, 100,000 times or 1,000,000 times higher than a concentration of the each HCP impurity.

15. The system of claim **11**, wherein the interacting peptide ligands are a library of combinatorial hexapeptide ligands.

16. The system of claim **11**, wherein a detection limit of the each HCP impurity is about 0.05-0.1 ppm.

17. The system of claim **11**, wherein the at least one high-abundance peptide or protein is an antibody, a bispecific antibody, an antibody fragment, a Fab region of an antibody, an antibody-drug conjugate, a fusion protein, a protein pharmaceutical product, or a drug.

18. The system of claim **11**, wherein an enzyme of the enzymatic digestion solution is trypsin.

19. The system of claim **11**, wherein the mass spectrometer is an electrospray ionization mass spectrometer, nano-electrospray ionization mass spectrometer, or a triple quadrupole mass spectrometer, wherein the mass spectrometer is coupled to a liquid chromatography system.

20. The system of claim **11**, wherein the mass spectrometer is capable of performing LC-MS (liquid chromatography-mass spectrometry) or a LC-MRM-MS (liquid chromatography-multiple reaction monitoring-mass spectrometry) analyses.

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